

Total No. of Questions—8]

[Total No. of Printed Pages—3

Seat No.	
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**[5559]-204**

**S.E. (I.T.) (First Semester) EXAMINATION, 2019**

**FUNDAMENTALS OF DATA STRUCTURES**

**(2015 PATTERN)**

**Time : 2 Hours**

**Maximum Marks : 50**

**N.B. :—** (i) Answer Q. 1 or Q. 2, Q. 3 or Q. 4, Q. 5 or Q. 6 and Q. 7 or Q. 8.

(ii) Neat diagrams must be drawn wherever necessary.

(iii) Figures to the right side indicate full marks.

(iv) Assume suitable data if necessary.

1. (a) Explain the need of parameter passing in functions. Demonstrate different types of parameter passing in C with example for each. [6]
- (b) Explain how strings are represented in C. Write a pseudo code for checking whether given string is a palindrome or not. [6]

*Or*

2. (a) Write a pseudo code to store heights of N students dynamically and find average height. [Use Malloc( )] [6]
- (b) Explain difference between structure and union. Demonstrate each with example. [6]

P.T.O.

3. (a) Discuss in detail the different asymptotic notations used to represent time complexity of an algorithm. [6]
- (b) With example, discuss the criteria for choosing a sorting algorithm based on the input size and time complexity.  
[Trade-off bubble, insertion and quicksort] [6]

*Or*

4. (a) For the following set of numbers, perform stepwise demonstration of merge-sort algorithm :  
91 23 48 13 97 63 27 36 57 [6]
- (b) Demonstrate how to access elements of an array using pointer notation. Write psudo code to find max-element in an array of size, using pointer notation. [6]
5. (a) Describe significance of sparse matrix. With example demonstrate the steps of sparse matrix addition. [8]
- (b) Explain representation of polynomial node using array and using structure. [6]

*Or*

6. (a) Explain the following Linear Data structures : [8]
- (i) Stack
- (ii) Queue.
- (b) Represent the following polynomials using array : [6]
- (i)  $3x^{14} + 2x^{-8} + 1$
- (ii)  $15x^3y^2 - 10x^2 + 7y - 10$ .

7. (a) What is ADT ? Explain singly linked list as ADT. [6]  
(b) Explain with example : [6]  
(i) Doubly linked list  
(ii) Circular linked list.

*Or*

8. (a) Write C function for inserting and deleting a node of SLL. [6]  
(b) Represent the following list using GLL : [6]  
(a, (b, c), (d, (c, f, g)), h).